

Abstract Submitted
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The evolution of large scale dense gas clouds at Jack Rabbit

PABLO HUQ, University of Delaware, TOM SPICER, University of Arkansas — Typically ammonia and chlorine are stored or transported as pressurized liquefied gas. There have been many accidents involving storage tanks and also accidents during transport. There is a need for accurate evaluation of the hazards associated with accidental releases of ammonia and chlorine which typically result in denser than air clouds which are toxic. The dense gas cloud slumps under the action of gravity into a thin layer with stable density gradients which suppress ambient atmospheric turbulence, and so complicating the physics of mixing. We present similarity analyses of one and two ton experimental releases of ammonia and chlorine at Jack Rabbit. Similarity analysis discriminates inertia-buoyancy and viscous-buoyancy regimes. Sequences of visualizations are used to determine propagation speeds of dense clouds. There is good agreement between observed speeds and the predictions of similarity analysis of the propagation of radial, dense gas clouds. Finally, comparison of one ton with two ton releases for both ammonia and chlorine lead to insights on scaling which are likely to be useful in the design of even larger scale experiments on dense gas clouds arising from similar configurations.

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